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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/559,743	12/07/2005	Yoshiyuki Suetsugu	28955.1062	5935

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EXAMINER	
EWALD, MARIA VERONICA	
ART UNIT	**PAPER NUMBER**
1722	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/559,743	SUETSUGU	
	Examiner	Art Unit	
	Maria Veronica D. Ewald	1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/7/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 13 recites the limitation "plurality of horns" in line 2; however, there is insufficient antecedent basis for this limitation in the claim since there is no previous mention of a "plurality of horns" only that the transmission member is a horn. Appropriate correction is required.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4, 7 – 8, 12 – 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Isayev, et al. (U.S. 5,284,625). Isayev, et al. teach an apparatus of

applying ultrasonic vibration to a resin material, which applies the ultrasonic vibration to the resin material in a molten state, the apparatus comprising: a vibrator which applies the ultrasonic vibration to the resin material, or a vibration transmission member which transmits the vibration of the vibrator to the resin material (item 15 – figure 1), wherein the vibrator or the vibration transmission member is disposed in a channel of the resin material in such a manner as to bring the vibrator or the vibration transmission member into contact with the resin material (figures 1 – 8); and vibration transmission inhibition means is disposed in such a manner as to substantially inhibit members other than the resin material from being vibrated by the vibration of the vibrator or the vibration transmission member (item 52 – figure 14; column 9, lines 15 – 22); wherein the vibration transmission inhibition means is an elastic member interposed between the vibrating member or the vibration transmission member and the other member (item 52 – figure 14; column 9, lines 15 – 22); wherein the vibration transmission inhibition means is a gap interposed between the vibrating member or the vibration transmission member and the other member (figures 1 and 14); wherein a size of the gap is set to 0.05 mm or more and 0.5 mm or less (column 9, lines 40 – 43).

With respect to claims 12 – 16 and 18, Isayev, et al. further teach that the vibrator or the vibration transmission member is a horn having any shape of a columnar shape, plate shape, ring shape, circular cone shape, truncated cone shape, conical shape, exponential shape, rectangular parallelepiped shape, cube shape, and a shape in which a slit cut or flange is formed on any of these shapes (figure 1); wherein the plurality of horns of arranged in series or in parallel along the channel (figures 4 – 8;

column 7, lines 55 – 69); wherein the plurality of horns are arranged around the channel and the vibration is applied to the resin material from different directions (figures 4 – 8); wherein the channel is formed in one of a cylinder of an extrusion machine or an injection molding machine, a cylinder of an extruder or a kneader, a chamber a downstream side from an outlet of the cylinder and a mold (figure 1; column 6, lines 60 – 68); wherein the resin material is one of a mixture of two or more resins and/or elastomers, and a mixture of a resin and/or an elastomer and a filler (column 3, lines 5 – 25); wherein a resin composition is produced using the apparatus (column 3, lines 5 – 25).

With respect to claim 17, Isayev, et al. teach a method of kneading, compounding and blending a resin material comprising the steps of: disposing the ultrasonic vibration applying apparatus in a channel through which the resin material having a molten state flows (figure 1; column 7, lines 5 – 15); and applying the ultrasonic vibration to the resin material which flows through the channel from a direction crossing a flow direction of the resin material at right angles (figures 4 – 8); the application of the ultrasonic vibration through the vibrator or the vibration transmission member being performed under conditions that members other than the vibrator or vibration transmission member are not substantially vibrated (figure 14).

Claims 1 – 2, 7 – 8, 12, 15 – 16, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Jameson, et al. (U.S. 6,010,592). Jameson, et al. teach an apparatus of applying ultrasonic vibration to a resin material, which applies the

ultrasonic vibration to the resin material in a molten state, the apparatus comprising: a vibrator which applies the ultrasonic vibration to the resin material, or a vibration transmission member which transmits the vibration of the vibrator to the resin material (item 116 – figure 1), wherein the vibrator or the vibration transmission member is disposed in a channel of the resin material in such a manner as to bring the vibrator or the vibration transmission member into contact with the resin material (figure 1; column 2, lines 10 – 32, column 5, lines 18 – 30); and vibration transmission inhibition means is disposed in such a manner as to substantially inhibit members other than the resin material from being vibrated by the vibration of the vibrator or the vibration transmission member (figure 1; column 2, lines 30 – 32); wherein a member having high adhesive properties to the resin material is selected as the vibrator or the vibration transmission member (column 15, lines 10 – 35); wherein the vibration transmission inhibition means is a gap interposed between the vibrating member or the vibration transmission member and the other member (figure 1); wherein a size of the gap is set to 0.05 mm or more and 0.5 mm or less (column 15, lines 13 – 33).

With respect to claims 12, 15 – 16 and 18, the reference further teaches that the vibrator or the vibration transmission member is a horn having any shape of a columnar shape, plate shape, ring shape, circular cone shape, truncated cone shape, conical shape, exponential shape, rectangular parallelepiped shape, cube shape, and a shape in which a slit cut or flange is formed on any of these shapes (figure 1); wherein the channel is formed in one of a cylinder of an extrusion machine or an injection molding machine, a cylinder of an extruder or a kneader, a chamber a downstream side from an

outlet of the cylinder and a mold (figure 1; column 5, lines 18 – 30); wherein the resin material is one of a mixture of two or more resins and/or elastomers, and a mixture of a resin and/or an elastomer and a filler (column 6, lines 40 – 67); wherein a resin composition is produced using the apparatus (column 6, lines 40 – 67).

Claims 1 – 5, 7, 12, 15 – 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Allan, et al. (U.S. 2006/0165832 A1). Allan, et al. teach an apparatus of applying ultrasonic vibration to a resin material, which applies the ultrasonic vibration to the resin material in a molten state, the apparatus comprising: a vibrator which applies the ultrasonic vibration to the resin material, or a vibration transmission member which transmits the vibration of the vibrator to the resin material (item 34 – figure 1), wherein the vibrator or the vibration transmission member is disposed in a channel of the resin material in such a manner as to bring the vibrator or the vibration transmission member into contact with the resin material (figure 1; paragraph 0010); and vibration transmission inhibition means is disposed in such a manner as to substantially inhibit members other than the resin material from being vibrated by the vibration of the vibrator or the vibration transmission member (item 40 – figure 1; paragraph 0039); wherein a member having high adhesive properties to the resin material is selected as the vibrator or the vibration transmission member (paragraphs 0038 – 0040); wherein the vibrator or vibration transmission member is positioned so as to transmit the vibration in a direction crossing a flow direction of the resin material at right angles (figures 1 – 5); wherein the vibration transmission inhibition means is an elastic member

interposed between the vibrating member or the vibration transmission member and the other member (item 40 – figure 1; paragraph 0039); wherein a connecting portion which connects the vibrating member or the vibration transmission member to the other member is progressively formed in a node portion of the vibration transmitted inside the vibrating member or the vibration transmission member, and the elastic member is interposed between the connecting portion and the other member (figures 1 and 2).

With respect to claims 7, 12 and 15.– 16 and 18, Allan, et al. also teach that the vibration transmission inhibition means is a gap interposed between the vibrating member or the vibration transmission member and the other member (figure 1); wherein the vibrator or the vibration transmission member is a horn having any shape of a columnar shape, plate shape, ring shape, circular cone shape, truncated cone shape, conical shape, exponential shape, rectangular parallelepiped shape, cube shape, and a shape in which a slit cut or flange is formed on any of these shapes (figure 1); wherein the channel is formed in one of a cylinder of an extrusion machine or an injection molding machine, a cylinder of an extruder or a kneader, a chamber a downstream side from an outlet of the cylinder and a mold (figures 1 – 5; paragraphs 0001 and 0015); wherein the resin material is one of a mixture of two or more resins and/or elastomers, and a mixture of a resin and/or an elastomer and a filler (paragraphs 0001 - 0003); wherein a resin composition is produced using the apparatus (paragraphs 0001 - 0003).

With respect to claim 17, Allan, et al. teach a method of kneading, compounding and blending a resin material comprising the steps of: disposing the ultrasonic vibration applying apparatus in a channel through which the resin material having a molten state

flows (figure 1; paragraph 0001); and applying the ultrasonic vibration to the resin material which flows through the channel from a direction crossing a flow direction of the resin material at right angles (figures 1 – 5); the application of the ultrasonic vibration through the vibrator or the vibration transmission member being performed under conditions that members other than the vibrator or vibration transmission member are not substantially vibrated (paragraph 0039).

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Isayev, et al. or Allan, et al. Isayev, et al. and Allan, et al. teach the characteristics previously described but do not specifically teach that the elasticity of the vibrating member relative (Eh) to the elastic member (E) is such that $0.3Eh > E$.

However, this is obvious and is within the level of one of ordinary skill in the art. The elastic member used by both Isayev, et al. and Allan, et al. is a Teflon gasket, while the ultrasonic horn is metal. The modulus of elasticity is defined as the stiffness of the material or the degree to which it deforms. Teflon will deform more readily and thus, its modulus of elasticity (or measure of stiffness) is lower than the metal horn, which is

more rigid and thus, its modulus of elasticity is higher. Furthermore, depending on the metal chosen, it is obvious that at some point 0.3Eh>E.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to ensure that Eh of the vibrating member is related to E of the elastic member such that 0.3Eh>E for the purpose of ensuring that the elastic member deforms more readily, able to absorb the vibrations transmitted to it without transmitting such vibrations to the other member, which in turn ensures that only the resin is vibrated.

Claims 9 – 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isayev, et al., Jameson, et al., or Allan, et al. in view of Rice (U.S. 5,269,860). Isayev, et al., Jameson, et al., and Allan, et al. teach the characteristics previously described but do not teach that the vibrator or vibration transmission member is subjected to some type of surface treatment to improve the adhesive properties of the resin material.

In a method to ultrasonically bond thermoplastic to fibers, Rice teaches the use of an ultrasonic horn to weld thermoplastic sheets to a fibrous textile surface. The ultrasonic horn used has a tip surface, which is shaped to follow the contour of the sheet being bonded (column 4, lines 20 – 30). The contour may be curved, round, solid or tubular (column 4, lines 20 – 30). Furthermore, Rice teaches that the use of maleic anhydride-based polymers (amorphous crystals) effectively transmit the ultrasonic energy due to their random molecular arrangement and thus, are appropriate to use when bonded to a non-thermoplastic fiber (column 2, lines 60 – 69; column 3, lines 1 –

10, 20 – 26). This suggests that the surface of the vibration transmission member or vibrator be subjected to surface treatment wherein the treatment is the formation of grooves or a concave/convex surface and wherein the adhesive improver is maleic anhydride.

Thus, it would have been obvious to one of ordinary skill in the art to modify the surface of the ultrasonic horn of Isayev, et al., Jameson, et al. or Allan, et al. such that it is subjected to surface treatment or an adhesive improver such as maleic anhydride for the purpose of readily and effectively transmitting the ultrasonic energy to the resin.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Isayev, et al., Jameson, et al. and Allan, et al. Isayev, et al., Jameson, et al., and Allan, et al. teach the characteristics previously described but do not teach that the resin composition is produced by mixing two or more thermoplastic resins and/or elastomers, wherein an interface is formed between the mixed thermoplastic resins, and one thermoplastic resin oozes like a feather into the other thermoplastic resin in the interface.

It is however, obvious that the apparatus is capable of producing such a composition, depending on the configuration of the extruder or injection molding apparatus. Furthermore, Allan, et al. state that ultrasonic vibration is known to improve the flow and distribution of the molding or resin material (paragraph 0002).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Isayev, et al., Jameson, et

al. or Allan, et al. such that a resin composition is produced wherein one resin oozes into the other like a feather at the interface depending on the final product desired and chosen by the manufacturer.

References of Interest

16. Furusawa, et al. (U.S. 5,202,066), Probst (U.S. 5,435,712), Nakamura (U.S. 6,190,601), Grunitz (U.S. 6,203,747), and Isayev, et al. (U.S. 2003/0124211 A1) are cited of interest to show the state of the art. Each of the above references teach the use of ultrasonic horns or apparatus in communication with a resin material transported through an extruder.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Veronica D. Ewald whose telephone number is 571-272-8519. The examiner can normally be reached on M-F, 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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